



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
[www.uspto.gov](http://www.uspto.gov)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/734,479	12/12/2003	Eun-Taek Yim	2522-042	9601
20575	7590	09/18/2006	EXAMINER	
MARGER JOHNSON & MCCOLLOM, P.C. 210 SW MORRISON STREET, SUITE 400 PORTLAND, OR 97204			CHAUDHRY, SAEED T	
			ART UNIT	PAPER NUMBER
			1746	

DATE MAILED: 09/18/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	<b>Application No.</b>	<b>Applicant(s)</b>	
	10/734,479	YIM ET AL.	
	<b>Examiner</b>	<b>Art Unit</b>	
	Saeed T. Chaudhry	1746	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) Responsive to communication(s) filed on 05 July 2006.
- 2a) This action is FINAL.                    2b) This action is non-final.
- 3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) Claim(s) 1-26 is/are pending in the application.
- 4a) Of the above claim(s) 20 and 21 is/are withdrawn from consideration.
- 5) Claim(s) \_\_\_\_\_ is/are allowed.
- 6) Claim(s) 1-3,7-15,22 and 23 is/are rejected.
- 7) Claim(s) 4,5,16-19 and 24 is/are objected to.
- 8) Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) The specification is objected to by the Examiner.
- 10) The drawing(s) filed on \_\_\_\_\_ is/are: a) accepted or b) objected to by the Examiner.  
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
 a) All    b) Some \* c) None of:  
 1. Certified copies of the priority documents have been received.  
 2. Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
 3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)                                  | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                         | Paper No(s)/Mail Date. _____ .                                    |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date _____ . | 5) <input type="checkbox"/> Notice of Informal Patent Application |
|  | 6) <input type="checkbox"/> Other: _____ .                        |

Art Unit: 1746

## **DETAILED ACTION**

Applicant's amendments and remarks filed July 7, 2006 have been acknowledged by the examiner and entered. Claim 6 has been canceled and claims 1-5 and 7-26 are pending in this application for consideration.

### **Claim Rejections - 35 USC § 112**

Claims 16-19 and 26 rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. Claims 16, 19 and 26, recite a limitation "chamber pressure of greater than 1 Torr". This limitation is not in the specification. On page 7, lines 9-16 recite limitations 0.1 to about 100 Torr or 0.1 to about 10 Torr. Therefore, specification does not support greater than 1 Torr.

### **New ground of rejection Claim Rejections - 35 USC § 102**

The following is a quotation of the appropriate paragraphs of 35 U.S.C. § 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless --

- (a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.
- (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.
- (c) he has abandoned the invention.
- (d) the invention was first patented or caused to be patented, or was the subject of an inventor's certificate, by the applicant or his legal representatives or assigns in a foreign country prior to the date of the application for patent in this country on an application for patent or inventor's certificate filed more than twelve months before the filing of the application in the United States.
- (e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.
- (f) he did not himself invent the subject matter sought to be patented.
- (g) before the applicant's invention thereof the invention was made in this country by another who had not abandoned, suppressed, or concealed it. In determining priority of invention there shall be considered not

only the respective dates of conception and reduction to practice of the invention, but also the reasonable diligence of one who was first to conceive and last to reduce to practice, from a time prior to conception by the other.

**Claims 1-3, 7-9, 25 and 26 are rejected under 35 U.S.C. § 102(b) as being anticipated by Gealy et al.**

Gealy et al (6,082,375 and 6,610211) disclose a method for cleaning metal oxide attached in the deposition chamber by providing a first gas HF, wherein the chamber does not contain a plasma; providing a second gas atomic oxygen which inherently decomposes the reacting residue; and removing the decomposed reaction residue from the chamber.

In accordance with a first preferred aspect of the invention, such a process includes treating the deposited material with atomic oxygen. Example sources for atomic oxygen treatment within the reactor include O<sub>3</sub>, a compound comprising nitrogen and oxygen (i.e., N<sub>2</sub>O, NO<sub>x</sub>, etc.), and remote plasma treatment of an oxygen source provided within the reactor to provide atomic oxygen (see col. 3, lines 31-33).

The atomic oxygen treatment preferably is conducted at a temperature from about 250° C. to no higher than about 675° C., with a range of from 300° C. to 650° C. being more preferred. Most preferred is treating temperature at or below 500° C. Also preferred is a temperature the same as the dielectric layer deposition temperature. A preferred pressure range for the treatment is from 500 mTorr-760 Torr (see col. 3, lines 46-52).

After the above treating, which for purposes of the continuing discussion only is referred to as a "first" treating, at least some of the deposited material from the reactor is etched from the reactor internal surfaces. At least where the deposited material comprises an oxide, the etching preferably utilizes a fluorine containing chemistry and a temperature no higher than about

Art Unit: 1746

675° C., and even more preferably no greater than about 550° C. Example etching chemistries include HF, NF<sub>3</sub>, or ClF<sub>3</sub>. The previous first treatment can facilitate rate of the etching as well as degree of etching of such oxide material from the internal reactor surfaces (see col. 3, line 62 to col. 4, line 9).

The references disclosed pressure of the chamber for the treatment from 500 mTorr to 760 Torr. Therefore, claimed pressure greater than 1 Torr anticipated by the references.

**Claims 22-23 are rejected under 35 U.S.C. § 102(e) as being anticipated by Mouri et al.**

Mouri et al (6,659,111) disclose a method for cleaning a deposition chamber by providing a first gas and a second gas for removing aluminum oxide, wherein the first gas is a fluorine containing gas.

The present invention resides in a cleaning gas for removing a deposited material generated in a vacuum treatment apparatus. The method comprises a step of flowing a cleaning gas in the vacuum treatment apparatus. It is preferable that the concentration of the HF gas of the cleaning gas is greater than or equal to 1% and the concentration of the oxygen containing gas of the cleaning gas is within a range from 0.5 to 99%.

As to the pressure during the cleaning operation employing the cleaning gas according to the present invention, it is necessary that the whole pressure, which is the sum of the HF gas partial pressure and the oxygen containing gas partial pressure, is smaller than or equal to 500 Torr. Preferably, the whole pressure should be smaller than or equal to 100 Torr, and it is further preferable that the pressure is within a range 0.1 to 10 Torr. More specifically, the

cleaning gas according to the present invention is applicable to (1) Al and Al-alloy such as A15052 and A16061 (JIS mark) at a temperature range not larger than 600.degree. C., (2) heat-resisting Ni-alloy at a temperature range not larger than 450.degree. C., (3) austenitic stainless steels at a temperature range of 450.degree. C., (4) ferritic stainless steels at a temperature range of 460.degree. C., (5) aluminum nitride at a temperature range not larger than 700.degree. C., (6) aluminum oxide at a temperature range not larger than 920° C (see col. 1, lines 53-62, col. 2, lines 24-25, 40-47 and col. 3, lines 18-30).

### **Claim Rejections - 35 USC § 103**

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in Graham v. John Deere Co., 148 USPQ 459, that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or unobviousness.

**Claims 11-16 are rejected under 35 U.S.C. § 103(a) as being unpatentable over**

**Gealy et al.**

Gealy et al were discussed supra. However, the reference fails to separately providing gases or alternately providing first or second gas.

Barnes et al (5,679,215) disclose a method of removing metal oxides from the surfaces of plasma processing chamber, wherein gases are separately provided in the chamber.

It is well known in the art to provide the ingredients such as gases separately or by first mixing the gases outside of the chamber as disclosed by Barnes et al. Therefore, it would have been obvious at the time applicant invented the claimed process manipulate the introduction of gases separately, alternatively or by first mixing gases outside of the chamber for the purpose to increase the through put of the chamber cleaning process.

**Claim 10 is rejected under 35 U.S.C. § 103 as being unpatentable over Gealy et al in view of Mouri et al.**

Gealy et al were discussed supra. However, the reference fails to aluminum oxide. It would have been obvious at the time applicant invented the claimed process to utilize the process of Gealy et al for removing aluminum oxide because Gealy et al remove metal oxide. One of ordinary skill in the art would expect that the aluminum oxide would be removed with the Gealy et al process since aluminum oxide is a metal oxide and it is known in the art to remove aluminum oxide from the chamber as disclosed by Mouri et al.

**Allowable Subject Matter**

Claims 16-19 would be allowable if rewritten or amended to overcome the rejection(s) under 35 U.S.C. 112, 2nd paragraph, set forth in this Office action.

Claims 4, 5 and 24 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

**Reasons For Allowable Subject Matter**

The following is an Examiner's statement of reasons for the indication of allowable subject matter:

Art Unit: 1746

None of the prior art discloses or suggests a process of cleaning deposition chamber having metal oxide, wherein second gas include a water vapor or diluting first or second gases with nitric acid gas or alcohol containing gas to reduce the removal rate of the metal oxide.

Applicant's arguments with respect to claims 1-26 have been considered but are deemed to be moot in view of the new grounds of rejection.

Applicant's amendment necessitated the new grounds of rejection. Accordingly, THIS ACTION IS MADE FINAL. See M.P.E.P. § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 C.F.R. § 1.136(a).

A SHORTENED STATUTORY PERIOD FOR RESPONSE TO THIS FINAL ACTION IS SET TO EXPIRE THREE MONTHS FROM THE DATE OF THIS ACTION. IN THE EVENT A FIRST RESPONSE IS FILED WITHIN TWO MONTHS OF THE MAILING DATE OF THIS FINAL ACTION AND THE ADVISORY ACTION IS NOT MAILED UNTIL AFTER THE END OF THE THREE-MONTH SHORTENED STATUTORY PERIOD, THEN THE SHORTENED STATUTORY PERIOD WILL EXPIRE ON THE DATE THE ADVISORY ACTION IS MAILED, AND ANY EXTENSION FEE PURSUANT TO 37 C.F.R. § 1.136(a) WILL BE CALCULATED FROM THE MAILING DATE OF THE ADVISORY ACTION. IN NO EVENT WILL THE STATUTORY PERIOD FOR RESPONSE EXPIRE LATER THAN SIX MONTHS FROM THE DATE OF THIS FINAL ACTION.

*Any inquiry concerning this communication or earlier communications from the examiner should be directed to Saeed T. Chaudhry whose telephone number is (571) 272-1298. The examiner can normally be reached on Monday-Friday from 9:30 A.M. to 4:00 P.M.*

*If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mr. Michael Barr, can be reached on (571)-272-1414. The fax phone number for non-final is (703)-872-9306.*

*When filing a FAX in Gp 1700, please indicate in the Header (upper right) "Official" for papers that are to be entered into the file, and "Unofficial" for draft documents and other communication with the PTO that are for entry into the file of the application. This will expedite processing of your papers.*

*Any inquiry of a general nature or relating to the status of this application should be directed to the Group receptionist whose telephone number is (571) 272-1700.*

Saeed T. Chaudhry  
Patent Examiner



MICHAEL BARR  
SUPERVISORY PATENT EXAMINER